



BCD DECODER/DRIVERS

BIP-8200P SERIES

The BIP-8200P Series Decoder/Drivers provide decimal readout on standard rectangular NIXIE® tubes from 8-wire, binary-coded decimal inputs. Solid State Decoder circuitry controls the selection of the NIXIE tube elements. The modules feature a socket pack construction; i.e., socket and decoder are an integral unit. Height and width dimensions are those of the socket itself, permitting minimum center-to-center spacing of multi-digit displays. Refer to Bulletins 1066 and 1054 for typical applications and theory of operation. Bezel assemblies for multi-tube displays are described in Bulletin 1020.

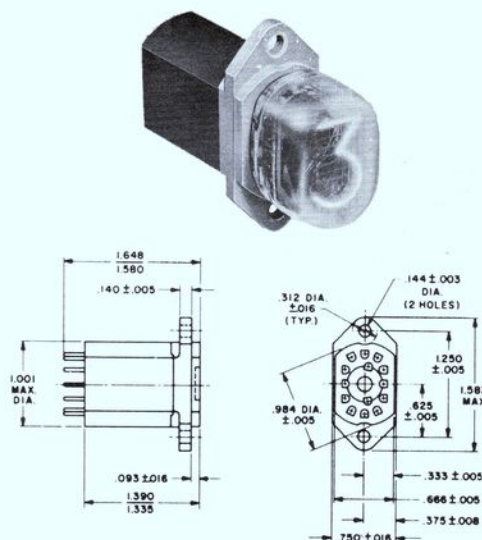
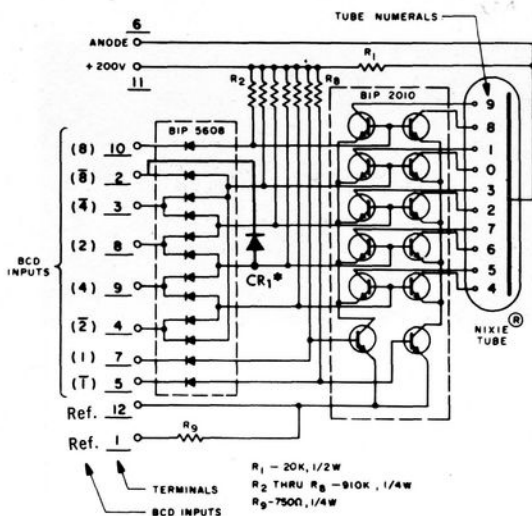


Figure 1. OUTLINE DRAWING (Note 2)

MODULE BIP-	CODE	NIXIE TUBES	FIGURE	FEATURES
8209P	4-2'-2-1	8422	5	Accepts 8-line BCD and drives standard rectangular tube.
8211P-1	Special 8-4-2-1	8422	2	Accepts 8-line special BCD and drives standard rectangular tube.
8217P	2'-4-2-1 & 2-4-2-1	8422	3	Accepts 8-line BCD and drives standard rectangular tube.
8218P	Excess 3	8422	4	Accepts 8-line BCD and drives standard rectangular tube.
8222P	8-4-2-1	B-59956	2	Accepts 8-line BCD and drives NIXIE tube with decimal point. Decimal point is independent of BCD input.
8223P	8-4-2-1	8422	2	Accepts 8-line BCD over wide temperature range of -55°C to $+85^{\circ}\text{C}$ and drives the standard rectangular tube.
8208P	5-4-2-1	8442	6	Accepts 8-line BCD and drives standard rectangular tube. Low level BCD inputs.
8227P	8-4-2-1	8422	2	Accepts 8-line BCD with 0.7 V logic level separations and drives standard rectangular tube.

GENERAL CHARACTERISTICS



* Diode CR1 is inserted in BIP-8211P-1 only.

SCHEMATIC
(Note 1)

Figure 2. BIP-8211P-1, BIP-8222P, BIP-8223P, BIP-8227P

NUMERICAL	BCD INPUT							
	8	4	2	1	$\bar{8}$	$\bar{4}$	$\bar{2}$	$\bar{1}$
0	0	0	0	0	1	1	1	1
1	0	0	0	1	1	1	1	0
2	0	0	1	0	1	1	0	1
3	0	0	1	1	1	1	0	0
4	0	1	0	0	1	0	1	1
5	0	1	0	1	1	0	1	0
6	0	1	1	0	1	0	0	1
7	0	1	1	1	1	0	0	0
8	1	0	0	0	0	1	1	1
9*	1	0	0	1	0	1	1	0
	1	1	1	1	0	0	0	0

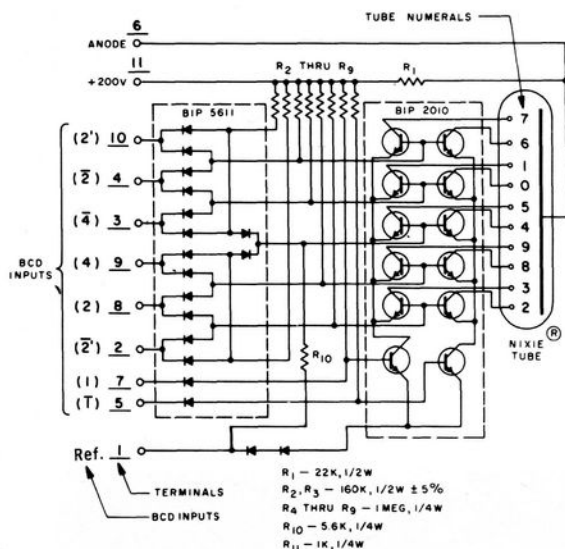
* BIP-8211P-1 accepts either BCD inputs shown for numeral 9. BIP-8222P/8223P/8227P only accept "1001" BCD.

TRUTH TABLE

TERMINAL	BCD
1	Ref.
2	$\bar{8}$
3	$\bar{4}$
4	$\bar{2}$
5	$\bar{1}$
6	Anode*
7	1
8	2
9	4
10	8
11	+ 200 Vdc
12	Ref.

* Terminal 6 on BIP-8222P is decimal point input.

PIN CONNECTIONS



SCHEMATIC
(Note 1)

NUMERAL	BCD INPUT							
	2'	4	2	1	$\bar{2}'$	$\bar{4}$	$\bar{2}$	$\bar{1}$
0	0	0	0	0	1	1	1	1
1	0	0	0	1	1	1	1	0
2	0	0	1	0	1	1	0	1
3	0	0	1	1	1	1	0	0
4*	0	1	0	0	1	0	1	1
	1	0	1	0	0	1	0	1
5	1	0	1	1	0	1	0	0
6	1	1	0	0	0	0	1	1
7	1	1	0	1	0	0	1	0
8	1	1	1	0	0	0	0	1
9	1	1	1	1	0	0	0	0

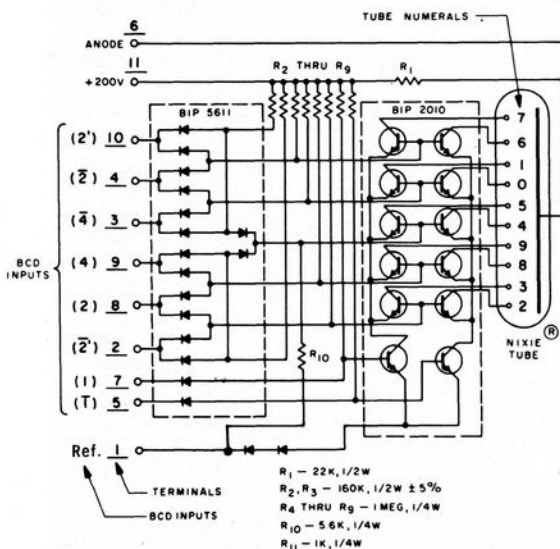
* Accepts either BCD input for numeral 4.

TRUTH TABLE

TERMINAL	BCD
1	Ref.
2	2'
3	$\bar{4}$
4	$\bar{2}$
5	$\bar{1}$
6	Anode
7	1
8	2
9	4
10	2'
11	+ 200 Vdc
12	Not Used

PIN CONNECTIONS

Figure 3. BIP-8217P



SCHEMATIC
(Note 1)

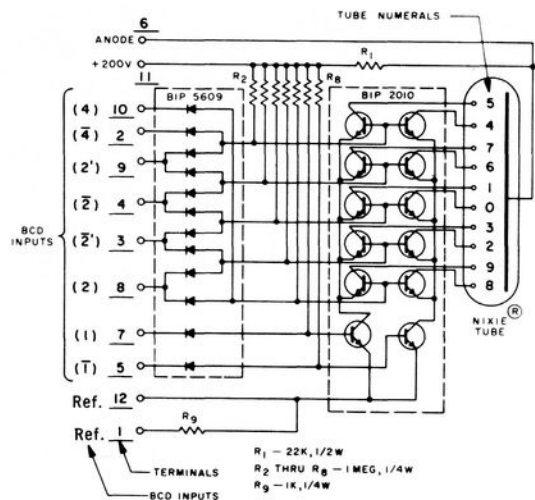
NUMERAL	BCD INPUT							
	A	B	C	D	$\bar{A}$	$\bar{B}$	$\bar{C}$	$\bar{D}$
0	0	0	1	1	1	1	0	0
1	0	1	0	0	1	0	1	1
2	0	1	0	1	1	0	1	0
3	0	1	1	0	1	0	0	1
4	0	1	1	1	1	0	0	0
5	1	0	0	0	0	1	1	1
6	1	0	0	1	0	1	1	0
7	1	0	1	0	0	1	0	1
8	1	0	1	1	0	1	0	0
9	1	1	0	0	0	0	1	1

TRUTH TABLE

TERMINAL	BCD
1	Ref.
2	$\bar{B}$
3	$\bar{A}$
4	$\bar{C}$
5	$\bar{D}$
6	Anode
7	D
8	C
9	A
10	B
11	+ 200 Vdc
12	Not Used

PIN CONNECTIONS

Figure 4. BIP-8218P



SCHEMATIC
(Note 1)

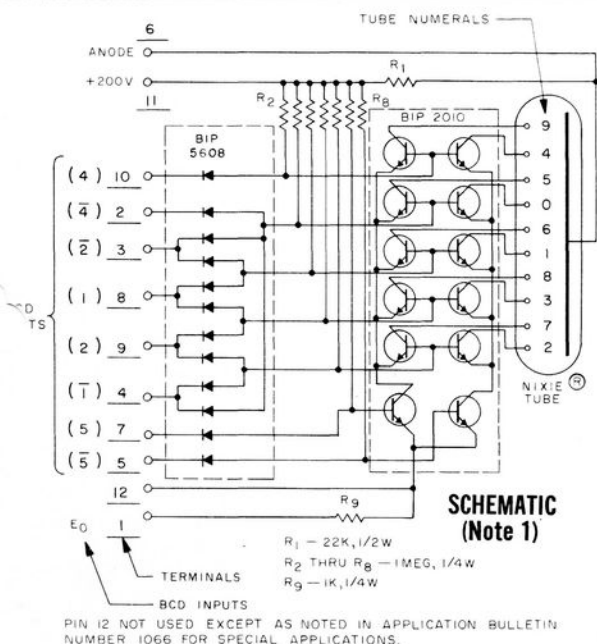
NUMERAL	BCD INPUT							
	4	2'	2	1	$\bar{4}$	$\bar{2}'$	$\bar{2}$	$\bar{1}$
0	0	0	0	0	1	1	1	1
1	0	0	0	1	1	1	1	0
2	0	0	1	0	1	1	0	1
3	0	0	1	1	1	1	0	0
4	0	1	1	0	1	0	0	1
5	0	1	1	1	1	0	0	0
6	1	1	0	0	0	0	1	1
7	1	1	0	1	0	0	1	0
8	1	1	1	0	0	0	0	1
9	1	1	1	1	0	0	0	0

TRUTH TABLE

TERMINAL	BCD
1	Ref.
2	$\bar{4}$
3	$\bar{2}'$
4	$\bar{2}$
5	$\bar{1}$
6	Anode
7	1
8	2
9	2'
10	4
11	+200 Vdc
12	Ref.

PIN CONNECTIONS

Figure 5. BIP-8209P



NUMERAL	BCD INPUT							
	5	4	2	1	$\bar{5}$	$\bar{4}$	$\bar{2}$	$\bar{1}$
0	0	0	0	0	1	1	1	1
1	0	0	0	1	1	1	1	0
2	0	0	1	0	1	1	0	1
3	0	0	1	1	1	1	0	0
4	0	1	0	0	1	0	1	1
5	1	0	0	0	0	1	1	1
6	1	0	0	1	0	1	1	0
7	1	0	1	0	0	1	0	1
8	1	0	1	1	0	1	0	0
9	1	1	0	0	0	0	1	1

TRUTH TABLE

TERMINAL	BCD
1	REF
2	4
3	2
4	1
5	5
6	Anode
7	5
8	1
9	2
10	4
11	+200 Vdc
12	Not Used

PIN CONNECTIONS

FIGURE 6. BIP-8208P

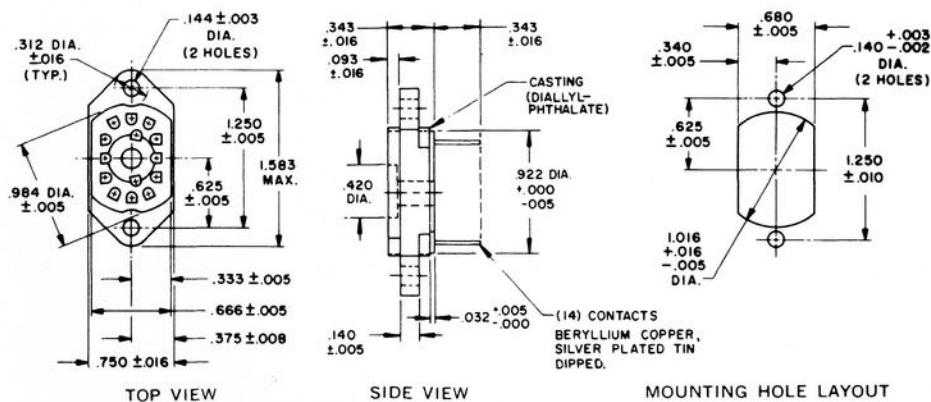
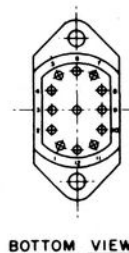


Figure 7. RECEPTACLE SK-169 (Note 4)



NOTE:
A polarizing pin is added to the connector. This pin is not internally connected and mates with terminal 14 of receptacle SK-169.

Figure 8. BASING DIAGRAM

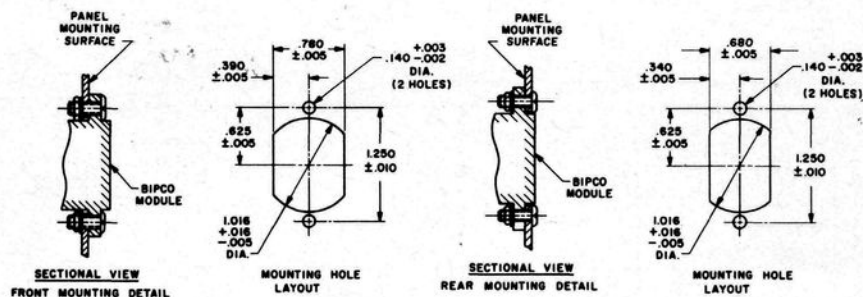


Figure 9 MOUNTING CONFIGURATIONS (Note 8)

ELECTRICAL SPECIFICATIONS

PART NO.	INPUT REQUIREMENTS (Notes 3, 6 and 7)						INPUT CURRENT	
	USING TERMINAL 12			USING TERMINAL 1			u a max	ma max
	LOGIC SEPARATION (Volts)	LOGIC 1 (Volts)	LOGIC 0 (Volts)	LOGIC SEPARATION (Volts)	LOGIC 1 (Volts)	LOGIC 0 (Volts)	LOGIC 1 PRESENT	LOGIC 0 PRESENT
8209P	2.3 to 30	1.4 to 25	-5.0 to -0.9	5.2 to 26	5.7 to 25	-1.0 to +0.5	10	1.0
8211P-1	2.3 to 30	1.4 to 25	-5.0 to -0.9	5.2 to 26	5.7 to 25	-1.0 to +0.5	10	1.0
8217P				4.0 to 27	4.3 to 25	-2.0 to +0.25	10	1.9
8218P				4.0 to 27	4.3 to 25	-2.0 to +0.25	10	1.9
8222P	2.3 to 30	1.4 to 25	-5.0 to -0.9	5.2 to 26	5.7 to 25	-1.0 to +0.5	10	1.0
8223P	2.3 to 30	1.4 to 25	-5.0 to -0.9	5.2 to 26	5.7 to 25	-1.0 to +0.5	10	1.0
8208P	2.3 to 30	1.4 to 25	-5.0 to -0.9	5.2 to 26	5.7 to 25	-1.0 to +0.5	10	1.0
8227P	0.7 to 15	0.45 to 10	-5.0 to -0.25	5.2 to 11	5.7 to 10	-1.0 to +0.5	10	1.0

MECHANICAL CHARACTERISTICS

Connector	12 pin rectangular socket base	Outline drawing	Figure 1
Receptacle	SK-169 (Figure 7) (Note 4)	Temperature (Note 9)	
Mounting Diagram	Figure 9, Note 8	Operating	-20°C to +85°C
Weight	1 oz. nom.	BIP-8223P	-55°C to +85°C
Basing Diagram	Figure 8	BIP-8227P	0°C to +85°C
		Non-Operating	-55°C to +85°C

NOTES

1. NIXIE tube anode is not used in the module operation.
2. NIXIE tube is not included as part of the module and must be ordered separately.
3. D.C. return for the +200V supply is connected to the reference terminal.
4. Receptacle SK-169 is not part of the module and must be ordered separately.
5. For B+ voltages higher than +200 Vdc, a resistor (R) must be added in series with R_i (see schematic diagrams) so that the voltage at Pin 11 is 200V ± 10V. (Pin 6, BIP-8225P) For example, to operate the BIP-8211P-1 at +300 Vdc, R is calculated by dividing the voltage difference, 100V (300-200) by the nominal current, 4ma. This gives 25K (100/4).
- 5a. All modules accept +200 V ± 10 Vdc @ 4 ma nom. (6 ma for BIP-8217P and BIP-8218P)
6. For logic "0" more positive than logic "1", reverse input signal and signal complement.
7. All voltages given are referenced to the reference terminal used.
8. Modules may be mounted in either front of, or behind panel (figure 9). Front mounting should be employed only when there is no back lighting. Rear mounting may be used whether or not back lighting is present. Following this rule will eliminate light showing through the panel.
9. This applies to module only, NIXIE tube temperature range is given in Brochure 616.

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